What is claimed is :

1. A color quantization method based on the HMMD color space comprising:

dividing the color space based on a plurality of differential values (diff) regions along a diff axis;

dividing a lowest diff region of the color space into N equal parts based upon sum regardless of hue wherein the lowest diff region is a gray region and wherein N is a natural number; and

dividing the rest of the diff regions based upon a sum axis and a hue axis.

2. The method of claim 1, wherein the lowest diff region centering around the diff axis is determined to be a region of low chroma.

3. The method of claim 1, wherein a longer sum width (a) is selected from both end sum widths (a,b) to be used when partial parts divided by the determined diff values are divided into equal parts by respective given constants based on the sum axis.

4. The method of claim 1, wherein the HMMD color space is divided into N equal parts based on the hue axis.

5. The method of claim 1, wherein the diff regions are divided into 2^x (x is a positive number) equal parts based on the sum axis and each of the equal parts based on the sum axis is divided into 2^y (y is a positive number) equal parts based on the hue axis.

6. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 6, 20, 60, and 110 are preselected to divide the color space along the diff axis, such that the color space is divided into 5 diff regions based on the preselected diff values, wherein the color space is divided into 256 spatial regions by

dividing the lowest or first diff region into 32 equal parts based on the sum axis so as to provide 32 spatial regions,

dividing the second diff region into 8 equal parts based on the sum axis and again into 4 equal parts based on the hue axis so as to provide 32 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and again into 16 equal parts based on the hue axis so as to provide 64 spatial regions,

dividing the fourth diff region into 4 equal parts based on the sum axis and again into 16 equal parts based on the hue axis so as to provide 64 spatial regions, and

dividing the fifth diff region into 4 equal parts based on the sum axis and again into 16 equal parts based on the hue axis so as to provide 64 spatial regions.

7. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 6, 20, 60, and 110 are preselected to divide the color space along the diff axis such that the color space is divided into 5 regions based on the preselected diff values, wherein the color space is divided into 128 spatial regions by

dividing the lowest or first diff region into 16 equal parts based on the sum axis so as to provide 16 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and again into 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and again into 8 equal parts based on the hue axis so as to provide 32 spatial regions,

dividing the fourth diff region into 4 equal parts based on the sum axis and again into 8 equal parts based on the hue axis so as to provide 32 spatial regions, and

dividing the fifth diff region into 4 equal parts based on the sum axis and again into 8 equal parts based on the hue axis so as to provide 32 spatial regions.

8. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 6, 20, 60, and 110 are preselected to divide the color space along the diff axis such that the color space is divided into 5 diff regions based on the preselected diff values, wherein the color space is divided into 64 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and again into 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and again into 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the fourth diff region into 2 equal parts based on the sum axis and again into 8 equal parts based on the hue axis so as to provide 16 spatial regions, and

dividing the fifth diff region into 8 equal parts based on the hue axis so as to provide 8 spatial regions.

9. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 6, 60, and 110 are preselected to divide the color space along the diff axis, such that the color space is divided into 4 diff regions based on the preselected diff values, wherein the color space is divided into 32 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and again into 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the hue axis so as to provide 4 spatial regions, and

dividing the fourth diff region into 4 equal parts based on the hue axis so as to provide 4 spatial regions.

10. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 9, 29, and 75 are preselected to divide the color space along the diff axis such that the color space is divided into 4 diff regions based on the preselected diff values, wherein the color space is divided into 32 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 2 equal parts based on the sum axis and 4 equal parts again based on the hue axis so as to be provide 8 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and into 3 equal parts based on the hue axis so as to provide 12 spatial regions, and

dividing the fourth diff region into 2 equal parts based on the sum axis and 2 equal parts based on the hue axis so as to provide 4 spatial regions.

11. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 9, 29, and 75 are preselected to divide the color space along the diff axis, such that the color space is divided into 4 diff regions based on the preselected diff values, wherein the color space is divided into 64 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and 6 equal parts based on the hue so as to provide 24 spatial regions, and

dividing the fourth diff region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 spatial regions.

12. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 9, 29, and 75 are preselected to divide the color space along the diff axis, and the color space is divided into 4 diff regions based on the preselected diff values, wherein the color space is divided into 120 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and into 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and 12 equal parts based on the hue axis so as to provide 48 spatial regions, and

dividing the fourth diff region into 4 equal parts based on the sum axis and 12 equal parts based on the hue axis so as to provide 48 spatial regions.

13. The method of claim 1, wherein the diff values range from 0 to 255, and diff values 9, 29, 75, and 200 are preselected to divide the color space along the diff axis such that the color space is divided into 5 diff regions based on the preselected diff values, wherein the color space is divided into 184 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and 8 equal parts based on the hue axis so as to provide 32 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and 12 equal parts based on the hue axis so as to provide 48 spatial regions,

dividing the fourth diff region into 4 equal parts based on the sum axis and 12 equal parts based on the hue axis so as to provide 48 spatial regions, and

dividing the fifth diff region into 2 equal parts based on the sum axis and 24 equal parts based on the hue axis so as to provide 48 spatial regions.

14. A color quantization method based on the HMMD color space comprising:

dividing the color space based on a plurality of differential values (diff) regions along a diff axis; and

dividing each of the diff regions into 2^x equal parts based on a sum axis and dividing each of 2^x equal parts into 2^y equal parts based on a hue axis, wherein x and y are integers.

15. The method of claim 14, wherein the diff values range from 0 to 255 for a color quantization level of 256 after division, and diff values 6, 20, 60, and 110 are preselected to divide the color space into the plurality of diff regions such that the color space is divided into 5 diff regions, wherein the color space is divided into 256 spatial regions by

dividing the lowest or first diff region into 32 equal parts based on the sum axis so as to provide 32 spatial regions,

dividing the second diff region into 8 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 32 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and 16 equal parts based on the hue axis so as to provide 64 spatial regions,

dividing the fourth diff region into 4 equal parts based on the sum axis and 16 equal parts based on the hue axis so as to provide 64 spatial regions, and

dividing the fifth diff region into 4 equal parts based on the sum axis and 16 equal parts based on the hue axis so as to provide 64 spatial regions.

16. The method of claim 14, the diff values range from 0 to 255 for a color quantization level of 128 after division, and diff values 6, 20, 60, and 110 are preselected to divide the color space such that the color space is divided into 5 diff regions, wherein the color space is divided into 128 spatial regions by

dividing the lowest or first diff region into 16 equal parts based on the sum axis so as to provide 16 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and 8 equal parts based on the hue axis so as to provide 32 spatial regions,

dividing the fourth diff region into 4 equal parts based on the sum axis and 8 equal parts based on the hue axis so as to provide 32 spatial regions, and

dividing the fifth diff region into 4 equal parts based on the sum axis and 8 equal parts based on the hue axis so as to provide 32 spatial regions.

17. The method of claim 14, wherein the diff values range from 0 to 255 for a color quantization level of 64 after division, diff values 6, 20, 60, and 110 are preselected to divide the color space such that the color space is divided into 5 diff regions wherein the color space is divided into 64 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the fourth diff region into 2 equal parts based on the sum axis and 8 equal parts based on the hue axis so as to provide 16 spatial regions, and

dividing the fifth diff region into 8 equal parts based on the hue axis so as to provide 8 spatial regions.

18. The method of claim 14, wherein the diff values range from 0 to 255 for a color quantization level of 32 after division, and diff values 6, 60, and 110 are preselected to divide the color space such that the color space is divided into 4 diff regions wherein the color space is divided into 32 spatial regions by

dividing the lowest or first diff region into 8 equal parts based on the sum axis so as to provide 8 spatial regions,

dividing the second diff region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 spatial regions,

dividing the third diff region into 4 equal parts based on the hue axis so as to provide 4 spatial regions, and

dividing the fourth diff region into 4 equal parts based on the hue axis so as to provide 4 spatial regions.

19. A color quantization method based on the HMMD color space comprising:

(a) dividing the color space into a reference quantization level by carrying out a color quantization using diff, sum, and hue; and

(b) carrying out another color quantization of a larger level by subdividing at least one of the respective sub-regions or spatial regions having been divided by the color quantization of step (a) based on at least one combination out of diff, sum, hue, min, and max.

20. The method of claim 19, wherein the reference quantization level is 32, diff values range from 0 to 255 and diff values 6, 60, and 110 are preselected to divide the color space into the reference quantization level such that the color space is divided into 4 spatial regions by the preselected diff values wherein the color space is divided into 32 spatial regions by

dividing the first spatial region into 8 equal parts based on the sum axis so as to provide 8 sub-regions,

dividing the second spatial region into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 16 sub-regions,

dividing the third spatial region into 4 equal parts based on the hue axis so as to provide 4 sub-regions, and

dividing the fourth spatial region into 4 equal parts based on the hue axis so as to provide 4 sub-regions.

21. The method of claim 20, wherein step (b) of carrying out the color quantization for a quantization level of 62 comprises:

dividing the second spatial region into two sub-spatial regions based on the diff value of 20,

dividing the sub-spatial regions into 4 equal parts respectively based on the sum axis while the quadruply-divided hue axis in step (a) remains as it is so as to provide 32 sub-regions,

maintaining the first spatial region having been divided into 8 equal parts in step (a) based on the sum axis,

dividing the third spatial region into 2 equal parts based on the sum axis and 8 equal parts instead of 4 equal parts in 32-level based on the hue axis so as to provide 16 sub-spatial regions, and

dividing the fourth spatial region into 8 equal parts instead of 4 equal parts in 32-level based on the hue axis so as to provide 8 sub-regions.

22. The method of claim 21, wherein step (b) of carrying out the color quantization for a quantization level of 128 comprises:

dividing the first spatial region into 16 equal parts instead of 8 equal parts in 64-level based on the sum axis so as to provide 16 sub-regions,

maintaining one of the sub-spatial regions having been divided into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis in the quantization level of 64,

dividing the other sub-spatial region into 8 equal parts instead of 4 equal parts in the quantization level of 64 based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to provide 32 sub-regions,

dividing the third spatial region into 4 equal parts based on the sum axis while maintaining the state that has been divided into 8 equal parts based on the hue axis so as to provide 32 sub-regions, and

dividing the fourth spatial region into 4 equal parts based on the sum axis while maintaining the state that has been divided into 8 equal parts based on the hue axis so as to provide 32 sub-regions.

23. The method of claim 22, wherein step (b) of carrying out the color quantization for a quantization level of 256 comprises:

dividing the first spatial region into 32 equal parts instead of 16 equal parts in 128-level based on the sum axis so as to provide 32 sub-regions,

dividing the one of the sub-spatial regions into 8 equal parts instead of 4 equal parts in 128-level based on the sum axis while maintaining the state that has been divided into 4 equal parts based on the hue axis so as to provide 32 sub-regions,

dividing the other sub-spatial region into 16 equal parts instead of 8 equal parts in 128-level based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to provide 64 sub-regions,

dividing the third spatial region into 16 equal parts instead of 8 equal parts in 128-level based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to provide 64 sub-regions, and

dividing the fourth spatial region into 16 equal parts instead of 8 equal parts in 128-level based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to provide 64 sub-regions.

24. The method of claim 19, wherein step (b) of carrying out another color quantization of a larger level subdivides at least one of the respective spatial regions, which have been divided by the color quantization of step (a), into smaller sub-regions based on at least one combination out of diff, sum, hue, min, and max.

25. A color quantization method based on the HMMD color space comprising:

(a) dividing the color space into a reference quantization level by carrying out a color quantization using diff, sum, and hue; and

(b) carrying out another color quantization of a smaller level by merging at least one of the respective sub-regions or spatial regions which have been divided by the color quantization of step (a).

26. The method of claim 25, wherein the reference quantization level (a) is 256, diff values range from 0 to 255 and diff values 6, 20, 60, and 110 are preselected to divide the color space into the reference quantization level such that the color space is divided into 5 spatial regions by the preselected diff values, wherein the color space is divided into 256 sub-regions by

dividing the first spatial region into 32 equal parts based on the sum axis so as to provide 32 sub-regions,

dividing the second spatial region is divided into 8 equal parts based on the sum axis and 4 equal parts based on the hue axis so as to provide 32 sub-regions,

dividing the third spatial region into 4 equal parts based on the sum axis and 16 equal parts based on the hue axis so as to provide 64 sub-regions,

dividing the fourth spatial region into 4 equal parts based on the sum axis and 16 equal parts based on the hue axis so as to provide 64 sub-regions, and

dividing the fifth spatial region into 4 equal parts based on the sum axis and 16 equal parts based on the hue axis so as to provide 64 sub-regions.

27. The method of claim 26, wherein the color space is divided into 128 sub-regions in step (b) of carrying out the color quantization for a quantization level of 128 comprises:

dividing the first spatial region into 16 equal parts based on the sum axis so as to reduce the sub-region to 16 sub-regions,

dividing the second spatial region into 4 equal parts based on the sum axis while maintaining the state that has been divided into 4 equal parts based on the hue axis so as to reduce the sub-regions to 16 sub-regions,

dividing the third spatial region into 8 equal parts based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to reduce the sub-regions to 32 sub-regions,

dividing the fourth spatial region into 8 equal parts based on the sum axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to reduce sub regions to 32 sub-regions; and

dividing the fifth spatial region into 8 equal parts based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to reduce the sub-regions to 32 sub-regions.

28. The method of claim 27, wherein step (b) of carrying out the color quantization for a quantization level of 64 comprises:

dividing the first spatial region into 8 equal parts based on the sum axis so as to reduce the sub-regions to 8 sub-regions,

maintaining the second spatial region that has been divided into 4 equal parts based on the sum axis and 4 equal parts based on the hue axis,

dividing the third spatial region into 4 equal parts based on the hue axis while maintaining the state that has been divided into 4 equal parts based on the sum axis so as to reduce the sub-regions to 16 sub-regions,

dividing the fourth spatial region into 2 equal parts based on the sum axis while maintaining the state that has been divided into 8 equal parts based on the hue axis so as to reduce the sub-regions to 16 sub-regions, and

dividing the fifth spatial region into 1 equal part based on the sum axis while maintaining the state that has been divided into 8 equal parts based on the hue axis so as to reduce the sub-regions to 8 sub-regions.

29. The method of claim 28, wherein step (b) of carrying out the color quantization for a quantization level of 32 comprises:

maintaining the first spatial region that has been divided into 8 equal parts based on the sum axis,

merging the second spatial region and the third spatial region in a merged region,

dividing the merged region into 4 equal parts based on the sum axis while maintaining the state that has been divided into 4 equal parts based on the hue axis so as to reduce the sub-regions to 16 sub-regions,

dividing the fourth spatial region into 4 equal part based on the hue axis and 1 equal part based on the sum axis so as to reduce the sub-regions to 4 sub-regions, and

dividing the spatial region into 4 equal parts based on the hue axis while maintaining the state that has been divided into 1 equal part based on the sum axis so as to reduce the sub-regions to 4 sub-regions..

30. A multimedia search method using color features quantized by a color quantization method for different levels comprising:

(a) mapping color labels of the features produced by a quantization method for a larger number of levels to one of the color labels of the features produced by a quantization method for a smaller number of levels;

(b) measuring similarity using the mapped color labels; and

(c) outputting multimedia data based on the measured similarity.

31. The method of claim 30, wherein a mapped color label, of (a) is determined provided that an arbitrary point at the corresponding spatial regions of the color label produced by the quantization method for a larger number of levels is included in one of the respective spatial regions corresponding to the color labels produced by the quantization method for a smaller number of levels to be mapped.

32. The method of claim 30, wherein the color label mapping of step (a) is executed at a time point initiating to compare the similarity of two initial data, wherein a mapping relationship of the color labels according to the two quantization methods is stored and wherein the stored relation table information is used for following data without further execution of another color label mapping.

33. A method of quantizing color features based on hue, max, min diff and sum color space comprising:

dividing the color space based on a prescribed number of differential values (diff) to create a plurality of spatial regions;

dividing each of the spatial regions into a plurality of sub-regions based on a prescribed number of hue and a prescribed number of sum values.

34. The method of claim 33, wherein differential values are preselected based on optimal searching performance.

35. The method of claim 33, wherein at least one spatial region is divided to create sub-partial regions or two spatial regions are merged for interoperability between different quantization levels.

36. The method of claim 33, wherein each of the spatial regions is divided based on a prescribed number of sum values and each of the divided spatial regions based on the

prescribed number sum values is divided based on the prescribed number of hue or vise versa to create the plurality of sub-regions.

37. The method of claim 36, wherein a total number of sub-regions is indicative of a level of quantization.

38. The method of claim 33, wherein the prescribed number of hue and prescribed number of sum values are arbitrarily selected.

39. The method of claim 33, wherein the prescribed number of hue and prescribed number of sum is selected based on optimal performance and interoperability.

40. The method of claim 33, wherein the prescribed number of sum values equal 2^x and the prescribed number of hue equals 2^y, where x and y are integers.